

NOTES ON *PALAEOPSYLLA*, A GENUS OF SIPHONAPTERA

By F. G. A. M. SMIT

In this paper (a) the genus *Palaeopsylla* Wagner, 1903, is divided into phylogenetic species-groups; (b) a description is given of a new species closely related to *Palaeopsylla remota*; and (c) the European subspecies (one of which is described as new) of *Palaeopsylla soricis* are dealt with.

THE SPECIES-GROUPS OF *PALAEOPSYLLA*

The 25 known species and subspecies of *Palaeopsylla* are associated with insectivore hosts (Talpidae and Soricidae) and occur throughout the Palaearctic Region with the exception of four species which are found in the Oriental Region (mountains of Burma, Malaya and Java respectively).

Palaeopsylla klebsiana Dampf, 1910, one of the two known fossil fleas (described from a single female in Baltic amber), does not fit into any of the three groups described below and constitutes a group of its own which appears to have affinities to the *remota*-group rather than to the two other groups. It is not possible to draw up a definition of the *klebsiana*-group on the same lines as those of the other groups, since the type-specimen (which, as Professor Peus informs me, is no longer in Kaliningrad and must be considered lost) did not permit a particularly detailed description. The original description of *Palaeopsylla klebsiana* might be taken as the definition of the *klebsiana*-group.

SORICIS-GROUP

Internal frontal marginal sclerotization below the frontal tubercle very narrow. Longest (third) spine of genal ctenidium abruptly narrowed beyond middle and tapering to a long and very narrow apex; second spine usually more or less spatulate, with only a short tapered apical portion. Pronotal ctenidium consisting of 16–18 spines of which at least the more dorsal ones are gently curved in such a way that their upper margins are slightly concave; correlated with this curvature is the tendency for the tips of the spines to be rounded off. Surface sculpture of abdominal segments reticulate, the posterior margins of these segments serrate. An average of 6 or 7 subdorsal spinelets each side on the posterior margins of the first 5 terga together.

MALE. Sternum VIII broadly rounded, with a minutely serrate posterior margin. Fixed process of clasper without a striarium. Acetabulum of clasper adjacent to base of manubrium. Distal arm of sternum IX of subequal width throughout, none of its apical setae subspiniform.

FEMALE. Ventral half of tergum VIII with a lateral oblique row of (normally)

three strong setae ; one strong lateral seta between this row and the posterior margin. Posterior margin of tergum VIII with a sinus ; the upper short and stout seta at the sinus is marginal, the lower stout, but longer, seta placed a short distance away from the margin. Apex of sternum VIII relatively broad, with minute apical setae.

HOSTS. Soricidae.

DISTRIBUTION. Palaearctic Region.

Here belong : *soricis* ssp., *sinica* Ioff and *vartanovi* Ioff.

MINOR-GROUP

Internal frontal marginal sclerotization below the frontal tubercle of medium width throughout, dark and compact. Longest (third) spine of genal ctenidium slender and gradually tapering to a long and narrow apex ; second spine broadest a little beyond middle and thence tapering to a sharp apex. Pronotal ctenidium consisting of 18 straight and sharply pointed spines. Surface sculpture of abdominal segments non-reticulate, the posterior margins of these segments smooth. An average of 5 or 6 (8 in male of *atlantica*) subdorsal spinelets each side at the posterior margins of the first 5 or 6 terga together.

MALE. Sternum VIII ventrally emarginate except in *alpestris*,¹ or with a small ventro-posterior sinus (in *atlantica* and *iberica*) ; the posterior margin finely serrate (in *minor*, *alpestris*, *similis*, *kohauti*, *cisalpina* and *steini* ; the serration slight in *caucasica*) or smooth (in *atlantica* and *iberica*). Fixed process of clasper with a striarium in *minor*, *alpestris*, *caucasica*, *atlantica* and *iberica*. Acetabulum of clasper distant from the base of the manubrium. Distal arm of sternum IX at least a little broader apically than basally (not tapering towards the apex), with—except in *caucasica* and *alpestris*—one or more short subspiniiform setae below the longest apical seta.

FEMALE. Ventral half of tergum VIII with a lateral oblique row of (normally) three strong setae ; one strong lateral seta between this row and the posterior margin (absent in the only available female of *P. caucasica*). Posterior margin of tergum VIII with a sinus, the margin meets the ventral margin at a sharp angle ; the upper short and stout seta at the sinus is marginal, the lower stout, but longer, seta placed only a little away from the margin (except in *atlantica* in which the lower seta is situated well away from the margin) ; there may be a third stout seta, of intermediate length, between the two setae mentioned. Apical half of sternum VIII rod-like, except in *atlantica* and *iberica* in which the apex is less sclerotized and the apico-dorsal free margin very short ; apex of sternum VIII with minute setae.

HOSTS. Talpidae.

¹ *P. alpestris* was described as a subspecies of *P. minor* and has since been referred to as *P. minor alpestris* Argyropulo. *P. alpestris* differs from *P. minor* as follows: (a) the internal frontal sclerotization below the frontal tubercle is narrower ; (b) sternum VIII of male ventrally not emarginate ; (c) the corpus of clasper is shorter ; (d) the proximal arm of sternum IX is much narrower and the distal arm is dorso-apically widened, while the long seta and the short subspiniiform below it are more widely spaced and thinner than in *P. minor* ; (e) the movable process has a more oblique apical margin and the upper angle of the acetabular part projects much less ; (f) in the female the dorsal lobe of the posterior margin of sternum VII is much more strongly developed while below the sinus the margin forms a distinct short lobe. These differences, taken together, are of a specific rather than of a subspecific nature ; however, there is no doubt about the close relationship between the two species.

DISTRIBUTION. European and Mediterranean subregions of the Palaearctic Region. The species which belong here can be placed into the following subgroups : (a) *minor* (Dale), *alpestris* Argyropulo, *similis* spp. and *caucasica* Argyropulo ; (b) *kohauti* Dampf, *cisalpina* Jordan & Rothschild and *steini* Jordan ; (c) *atlantica* Jordan & Rothschild and *iberica* Jordan & Rothschild. *Palaeopsylla osetica* Ioff, not seen, probably belongs to this group.

REMOTA-GROUP

Internal frontal marginal sclerotization below the frontal tubercle relatively broad and rather irregularly shaped, not strongly sclerotized and much broken up by haemocoelae (some specimens of *remota* and *miranda* do not quite agree with this description and are more like specimens of the *minor*-group in this respect). Longest (third) spine of genal ctenidium in varying degrees abruptly tapering to a very narrow apex. Spines of pronotal ctenidium either straight and sharp (in *remota*, *nippon* and *mogura*) or curved and tending to be blunt-ended (in *miyama*, *incurva* and *laxata*), the ctenidium consisting of 16, 18 or 20 spines. Surface sculpture of abdominal segments non-reticulate, the posterior margins of these segments smooth. An average of 8 (6 in *remota* and *miranda*, 12-14 in *miyama*) subdorsal spinelets each side at the posterior margins of the first 5 or 6 terga together.

MALE (this sex is not known of *incurva* and *laxata*). Posterior margin of sternum VIII rounded and smooth. Fixed process of clasper with a striarium. Acetabulum of clasper practically adjacent to base of manubrium. Distal arm of sternum IX narrow and very gradually tapering towards the apex which bears several shortish setae, none of which is subspiniform.

FEMALE. Ventral half of tergum VIII with a lateral vertical row of (normally) three strong setae ; no lateral seta between this row and the posterior margin. Posterior margin of tergum VIII with a lateral hump along which about half a dozen short setae which are not particularly stout (none of the genital setae is placed on the inner lateral surface of tergum VIII) ; the margin below the hump smoothly convex, not angulate. Apical half of sternum VIII free, with several longish apical setae.

HOSTS. Soricidae and Talpidae.

DISTRIBUTION. Eastern Palaearctic Region, Oriental Region.

Here belong : *remota* Jordan, *miranda* Smit, *nippon* Jameson & Kumada, *miyama* Sakaguti & Jameson, *incurva* Jordan, *laxata* Jordan and *mogura* Jameson & Sakaguti.

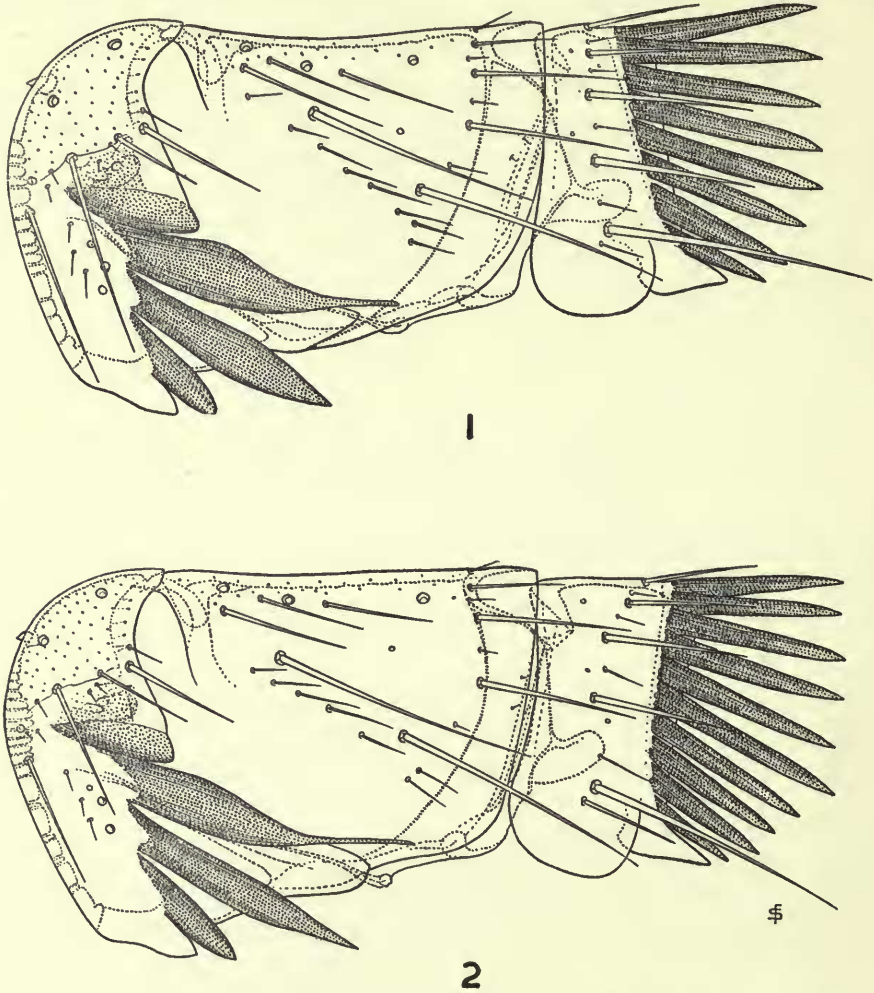
Palaeopsylla miranda sp. n.

(Text-figs. 2, 4, 6, 8, 9)

TYPE MATERIAL. Male holotype, female allotype and three male and three female paratypes from Mt. Victoria, 2,800 m., Pakokku Chin Hills, Burma, from *Talpa micrura leucura*¹, 4. v. 1938, G. Heinrich.

¹ On the original label the host was given as "Talpa (Balg 753)" but Prof. Dr. F. Peus has most kindly ascertained for us that Heinrich's skin No. 753 is that of *Talpa micrura leucura* Blyth.

DIAGNOSIS. This new species is extremely closely related to *Palaeopsylla remota* Jordan, 1929 (a parasite of *Anurosorex* in South-East Asia) and differs from the latter by (a) the first three genal spines being longer and slenderer, (b) more numerous pronotal spines, namely 20 instead of 16, (c) a somewhat irregularly shaped movable process with a rounded apex, as against a straight movable process with a truncate



FIGS. 1, 2. Head and pronotum of : 1. *Palaeopsylla remota* Jordan, ♂ (from Mt. Victoria, Burma); 2. *Palaeopsylla miranda* sp. n., ♂ (holotype).

apex, (d) some differences in the structures of the aedeagus, and (e) in the female by a differently shaped lower lateral lobe of the posterior margin of sternum VII.

DESCRIPTION. The two anterior long setae of the frontal row are considerably shorter than those in *P. remota* (Text-fig. 2, cf. Text-fig. 1). First (lowest) genal spine with a pointed apex (a rounded apex in *P. remota*); second genal spine slender,

not much widened just before it narrows gradually to a sharply pointed apex; the third genal spine likewise not much widened, its apical part drawn out into a long and thin tip—both the second and third spines are longer than those of *P. remota*. Pronotum (Text-fig. 2, cf. Text-fig. 1) dorsally much longer than in *P. remota* and

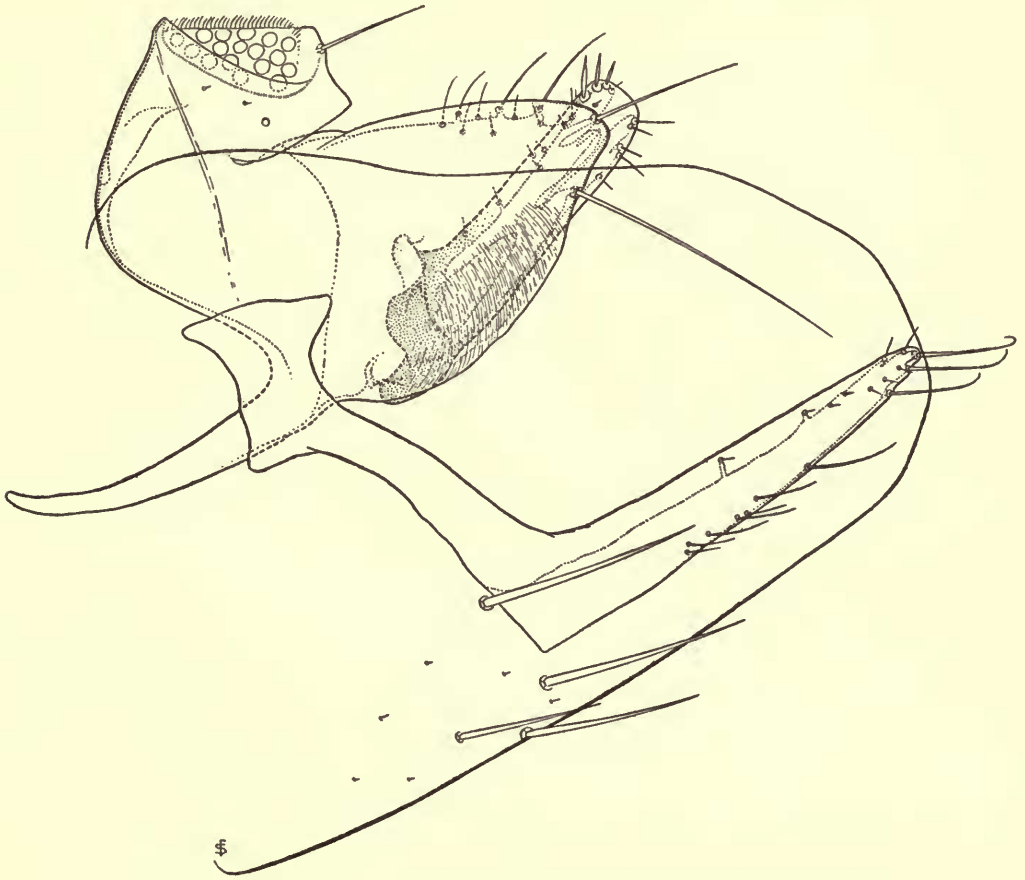


FIG. 3. *Palaeopsylla remota* Jordan. Sternum VIII and segment IX, ♂ (from Mt. Victoria, Burma).

while the latter has a pronotal ctenidium consisting of 16 spines, the pronotum of the new species bears 20 spines (in one of the males even 22) which are also a little more sharply pointed. Mesothorax, metathorax and legs virtually as in *P. remota*. Unmodified abdominal segments similar to those in *P. remota*, but the spiracular fossae are on the whole somewhat smaller in *P. miranda*.

MALE (Text-figs. 4, 6). Lower stretch of posterior margin of sternum VIII forming an angle with the ventral margin; in *P. remota* the corresponding stretch forms a straight continuation of the ventral margin. Corpus of clasper and manubrium similar in the two species. Movable process (Text-fig. 4) with a somewhat undulate anterior margin and a slightly convex posterior margin (this process shows a tendency

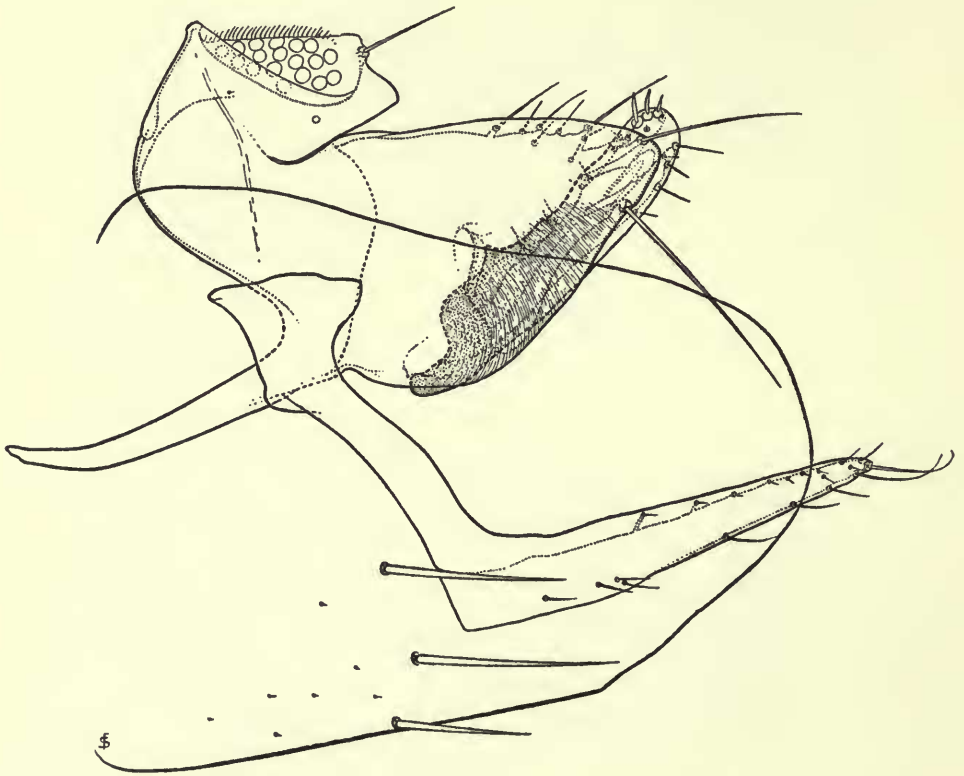
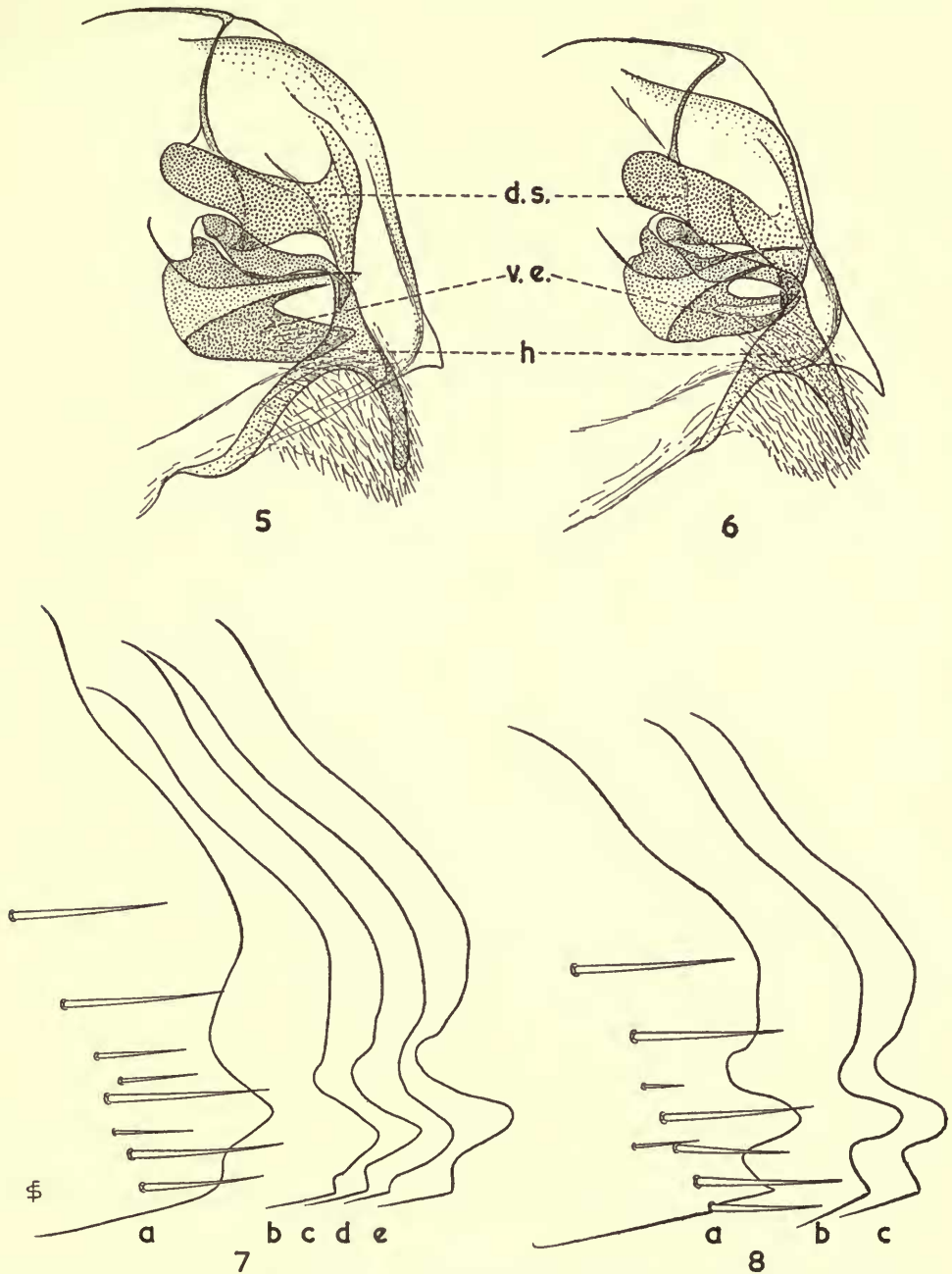


FIG. 4. *Palaeopsylla miranda* sp. n. Sternum VIII and segment IX, ♂ (holotype).

to become curved); tip of movable process rounded. In *P. remota* (Text-fig. 3) the movable process is straight, of the same width throughout most of its length and the apex is markedly truncate. Sternum IX does not show any constant differences between the two species. For differences in the apical sclerites of the aedeagus contrast Text-fig. 5 and Text-fig. 6; note that (a) the apico-ventral extension of



FIGS. 5-8. Apex of aedeagus of : 5. *Palaeopsylla remota* Jordan (from Mt. Victoria, Burma); 6. *Palaeopsylla miranda* sp. n. (holotype). Figs. 7, 8. Outlines of sternum VII of females of : 7. *Palaeopsylla remota* Jordan (a, holotype; b and c, Lingtam, Sikkim, India; d and e, Mt. Victoria, Burma); 8. *Palaeopsylla miranda* sp. n. (a-c, paratypes).

the dorso-apical sclerite (d.s.) is longer in *P. remota*, (b) the large ventral extension (v.e.) of the inner tube has a less sclerotized area in *P. miranda*, and (c) the prongs of the Y-shaped hamulus (h) are considerably longer in *P. remota* than in *P. miranda*.

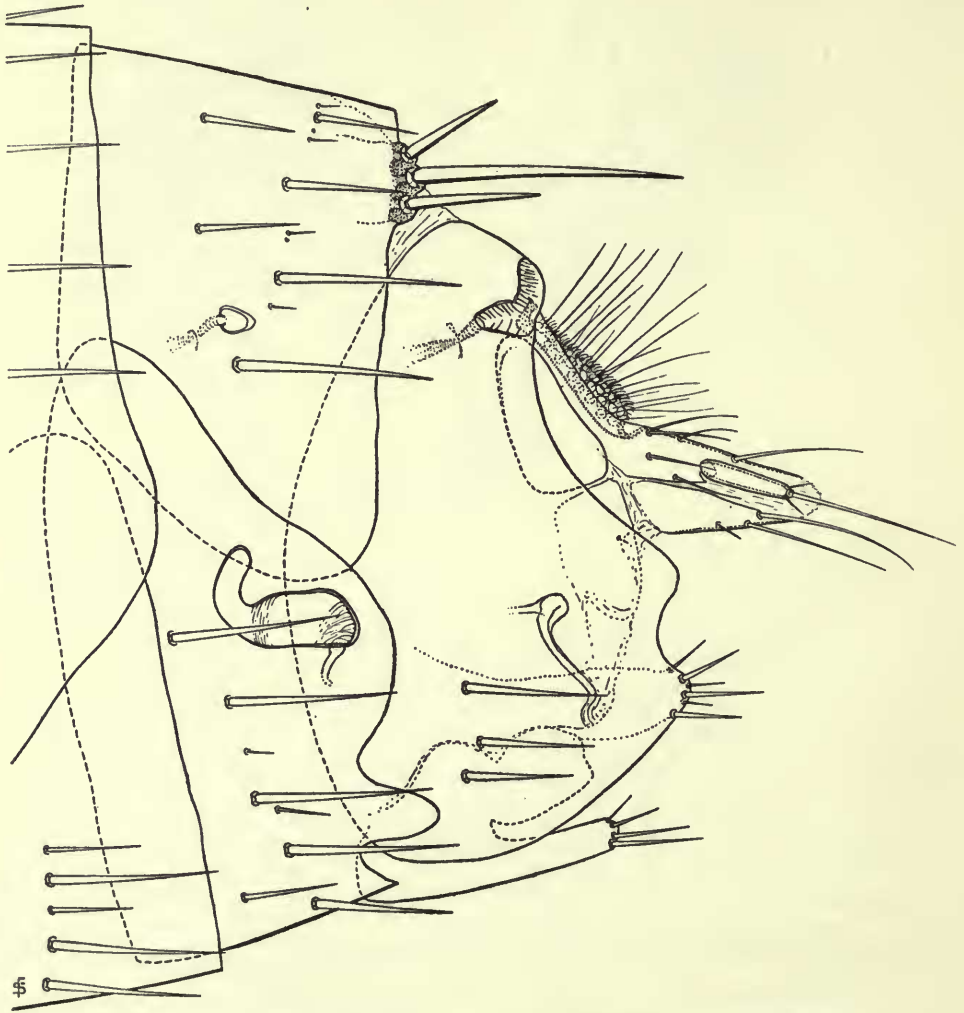


FIG. 9. *Palaeopsylla miranda* sp. n. Terminalia of allotype.

FEMALE (Text-figs. 8, 9). The lower lateral lobe of the posterior margin of sternum VII is basally narrower and less distinctly triangular than in *P. remota* (Text-figs. 8, 9, cf. Text-fig. 7); the margin below this lobe is longer than in *P. remota* and may form a sharp angle with the ventral margin, which it apparently never does in *P. remota*. The ventral margin of tergum VIII below the apical group of setae tends

to be more strongly convex in *P. remota* than in *P. miranda*. Otherwise the female terminal abdominal segments and genitalia do not differ.

LENGTH. ♂ 2–2¼ mm. ; ♀, 2½ mm.

REMARKS. Li (1957, *Acta zool. sinica* 9 : 28, 33) states that in Western Yunnan a species of *Palaeopsylla* was found on *Parascaptor leucura* [= *Talpa micrura leucura*] which is not *P. remota* as described by Jordan from Szechwan. Since *P. remota* appears to occur throughout most of the range of its host, *Anurosorex* (the flea is known from Sikkim, Burma, Szechwan and Formosa), there is a strong probability that the *Palaeopsylla* found in Western Yunnan on *Talpa micrura leucura* is identical with *P. miranda*.

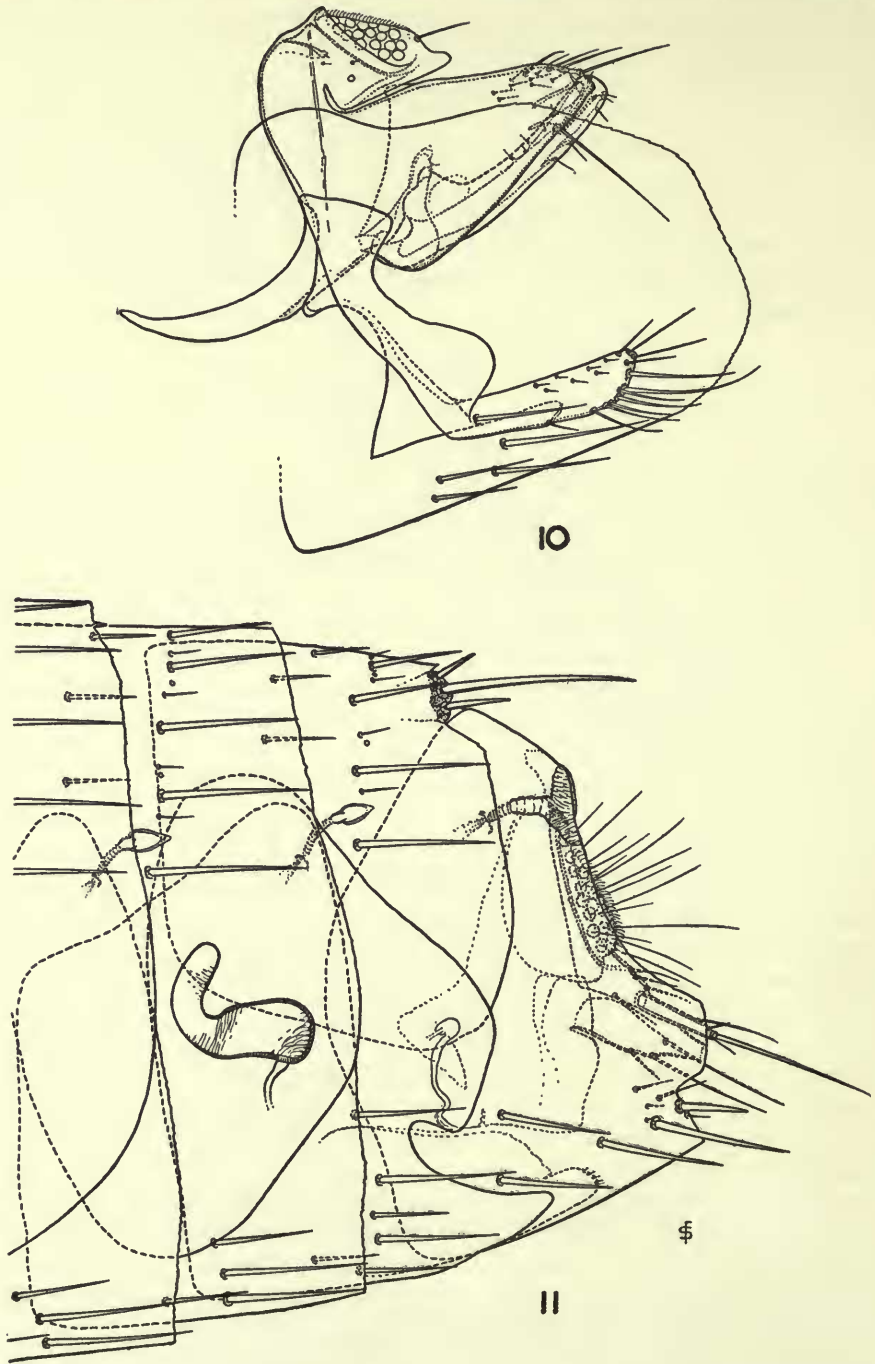
THE EUROPEAN SUBSPECIES OF *PALAEOPSYLLA SORICIS*

Palaeopsylla soricis (Dale) is a common flea of shrews in Europe (not yet recorded from the Iberian peninsula where it may perhaps be absent or possibly be present only at high altitudes) and Asia (east to Tyan-Shan, Altai Mts. and western Transbaikalia). In Europe it appears to be commonest on *Sorex araneus*, but it should be noted that members of this species are far more often examined for fleas than are any of the other European shrews (*Neomys*, *Crocidura* and *Suncus*). Darskaya (1953, *Vopr. Parazit. med. Zool.* 8 : 166–174) found that in the Mikheno district of the Moscow oblast the numerosity of *P. soricis* on *Neomys fodiens* is almost nine times as great as on *Sorex araneus* and she surmises that some of the causes of greater infestation of water-shrews by fleas may be the relationship of the latter with a specific micro-habitat, a more settled way of life of the water-shrew and, possibly, the presence of permanent burrows.

Dampf (1926, *Ent. Mitt.* 15 : 385) remarked that “Die östliche Form [von *Palaeopsylla soricis*] scheint eine eigene Lokalrasse zu bilden”; his material was from East Prussia and was doubtless the same subspecies as that which Wagner in 1930 described as *Palaeopsylla soricis starki* from material from the Bryansk oblast in Byelorussia. The characters on which Wagner differentiated this subspecies proved to be unsatisfactory and Smit (1957, *Handbks Identif. Brit. Ins.* 1 (16) : 37), though not having seen any male specimens from the U.S.S.R., suggested that *P. soricis starki* might be a synonym of the nominate subspecies.

Argyropulo (1946, *Med. Parasitol., Moscow*, 15 : 91) described another subspecies, *Palaeopsylla soricis gromovi*, from material from North-West Caucasus; this is quite distinct in the male sex.

When studying the aedeagus of European specimens of *Palaeopsylla soricis* from the Tring collection I noticed that this material actually consists of three subspecies: the nominate western subspecies, the eastern subspecies *P. s. starki* and an undescribed central European subspecies. All three subspecies are dealt with below; since the females of the known subspecies of *Palaeopsylla soricis* are indistinguishable from each other, they are not discussed here, but a figure has been included of the terminal abdominal segments and genitalia of the neallotype of *Palaeopsylla soricis soricis* (Dale) (Text-fig. 11).



FIGS. 10, 11. *Palaeopsylla soricis soricis* (Dale). 10. Sternum VIII and segment IX (neotype, from Bath, Somerset, England); 11. Terminalia of female (neallotype, from Bath).

Palaeopsylla soricis soricis (Dale, 1878)

(Text-figs. 10-12, 15, 19)

*Ceratophyllus sorecis*¹ Dale, 1878, *History Glanville's Wootton*, 291 (Glanville's Wootton, Dorset, England, from shrews).

Typhlopsylla "gracilis" Taschbg.. Rothschild, 1898 (*nec* Taschenberg, 1880), *Novit. zool.* 5 : 541, pl. 17, fig. 16.

Ctenopsyllus sorecis (Dale). Baker, 1905, *Proc. U. S. nat. Mus.* 29 : 156.

Palaeopsylla sorecis (Dale). Dampf, 1910, *Schr. phys.-ökon. Ges. Königsb.* 51 : 329.

Palaeopsylla soricis (Dale). Smit, 1952, *Ent. mon. Mag.* 88 : 133.

Palaeopsylla soricis soricis (Dale). Smit, 1954, *Danm. Fauna*, 60 : figs. 60, 62, 63 (drawn from specimens from The Netherlands); Smit, 1957, *Handbks Identif. Brit. Ins.* 1 (16) : 36, figs 71-73; Smit, 1960, *Ent. Gaz.* [in press] (designation of neotype).

All references to specimens from the British Isles, Netherlands, Belgium, France, Switzerland and Italian Dolomites (San Martino di Castrozza, Völs [now Fiè] and Rolle Pass) refer to this subspecies.

MALE. Distinguishable from *P. s. starki* by the more strongly oblique apical margin of the distal arm of sternum IX (contrast Text-fig. 12 with Text-fig. 14) ; differing

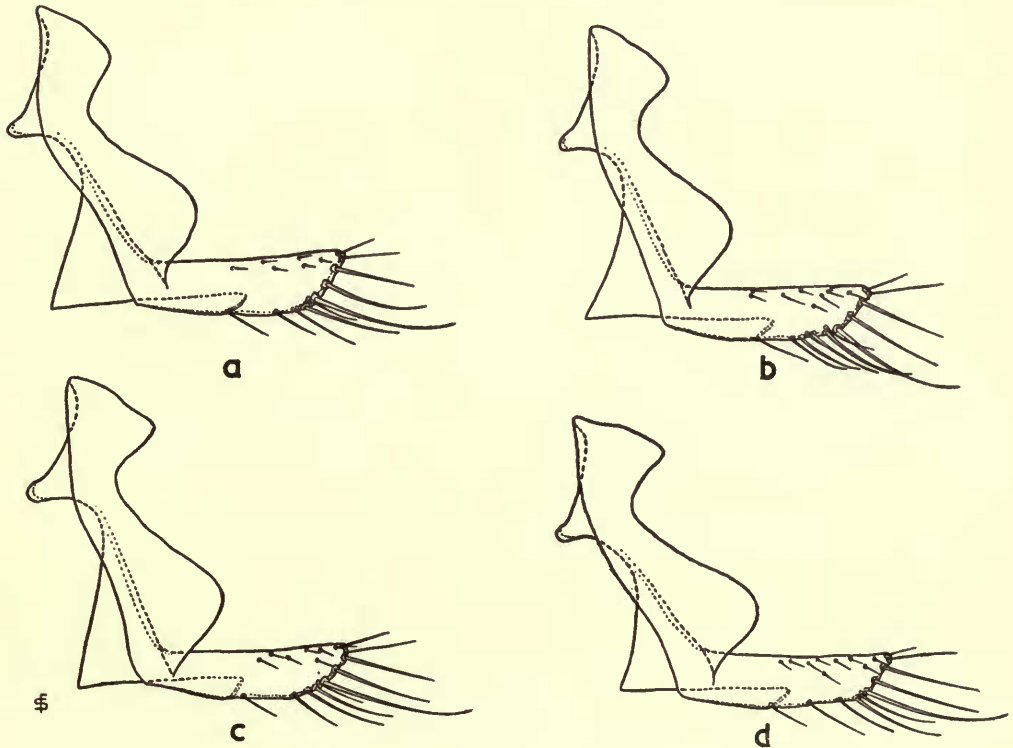


FIG. 12. *Palaeopsylla soricis soricis* (Dale). Sternum IX of four males (a, Bath, England ; b, Wilp, Netherlands ; c, Sarstedt, Germany ; d, Göschenen, Switzerland).

¹ A misprint for *soricis* ; see Smit, 1952 : 133.

from *P. s. starki* and *P. s. rosickyi* by details of the apical sclerites of the aedeagus (contrast Text-fig. 15 with Text-figs. 16 and 17). Text-figs. 10 and 15 respectively show the modified abdominal segments and the phallosome of the neotype from Bath, Somerset, England.

The distribution, shown in Text-fig. 19, is based on male specimens examined by me from the following localities :

BRITISH ISLES : Orkney Isles ; Achmore near Assynt (Sutherland), Berry Hill, Cults, Craigiebuckler, Murcher Links, Hilton, Seaton, banks of River Don, Cairney, Parkhill, Cornhill, Rosehill, Scotstown (all in Aberdeenshire) ; Tullus Hill and Nigg

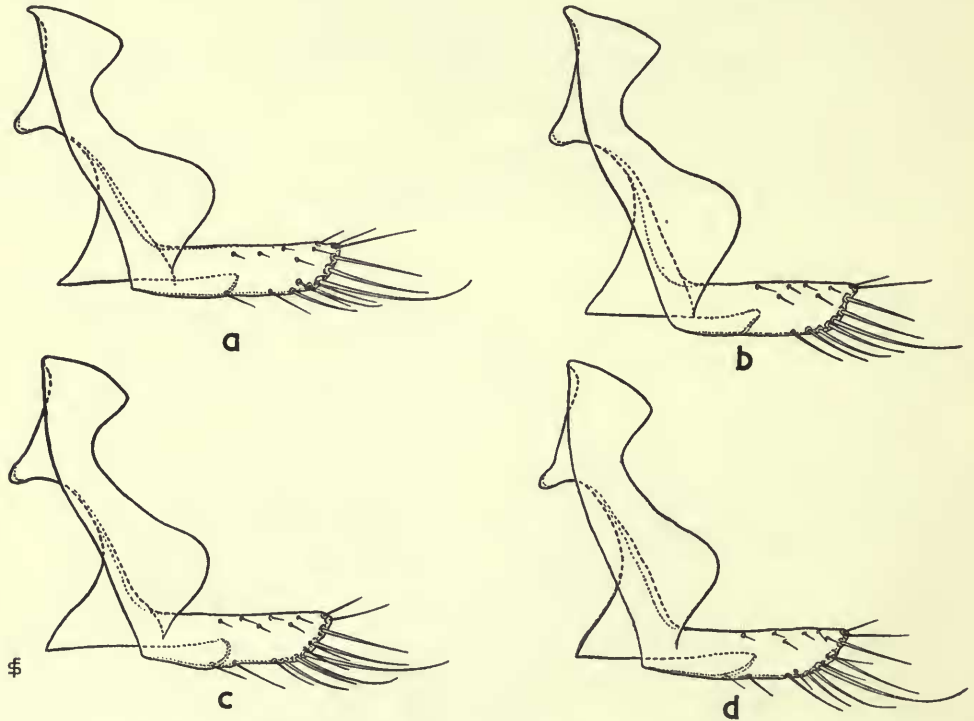


FIG. 13. *Palaeopsylla soricis rosickyi* subsp. n. Sternum IX of four males (*a*, Karlova Studánka, Czechoslovakia ; *b*, Hofeberg, Glatzer Schneeberg, Poland ; *c* and *d*, Magdeburg, Germany).

(Kincardineshire) ; Abernyte, Kinloch Rannoch, Loch Tay, and Tyndrum (Perthshire) ; Sunart (Argyllshire) ; Glen Cova and Dundee (Angus) ; Luffness, Aberlady (East Lothian) ; Mull ; Watermillock on Ullswater (Cumberland) ; Spurn (Yorkshire) ; Aberystwyth (Cardiganshire) ; Penard, Gower Peninsula, Port Eynon district, Gower Peninsula (Glamorgan) ; Gloucester (Gloucestershire) ; Oundle and Ashton near Oundle (Northamptonshire) ; Osea Island (Essex) ; Tring, Berkhamsted and Boxmoor (Hertfordshire) ; Shoreham (Kent) ; Abinger Common

(Surrey); Bagley Wood, Calcot near Reading, and Shrivenham (Berkshire); Brockenhurst and Lyndhurst (Hampshire); Newport and Whitcombe (Isle of Wight); Bath, Porlock, Porlock Weir and Ashley-Combe near Porlock Weir (Somerset); Braunton, Hartland Quay, Lynton and Sidmouth (Devonshire); St. Ives (Cornwall).

FRANCE: Buré d'Orval (Meurthe-et-Moselle); Strasbourg (Bas-Rhin); Etupes (Doubs).

NETHERLANDS: Terschelling (Friesian Island); Wilp, Renkum, and Oosterhout near Nijmegen (Gelderland).

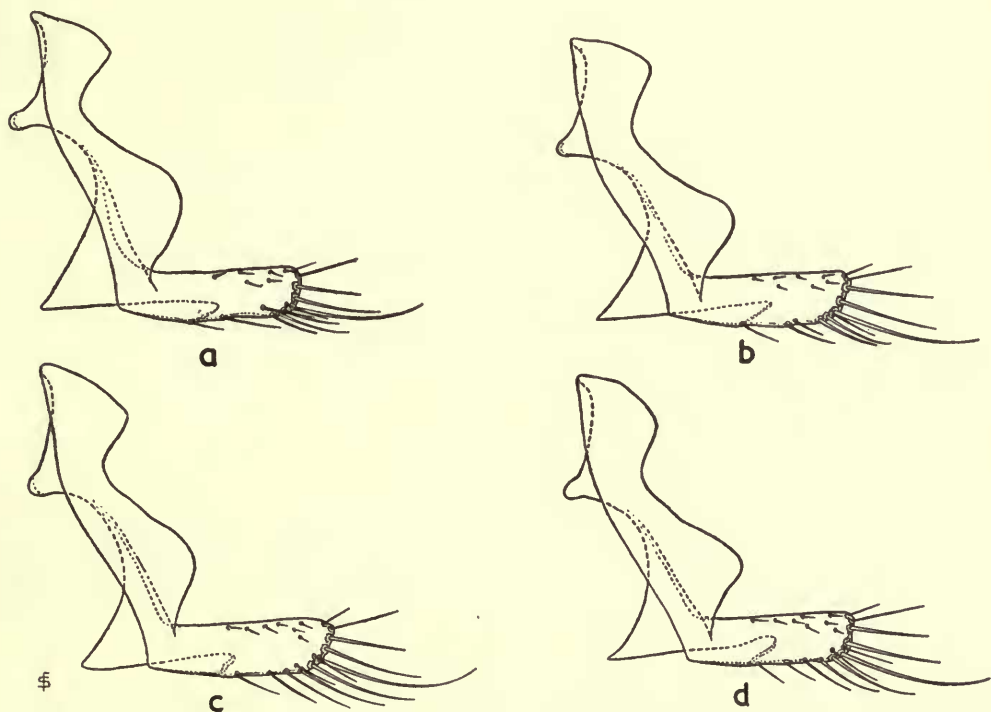


FIG. 14. *Palaeopsylla soricis starki* Wagner. Sternum IX of four males (*a*, Biharfüred, Romania; *b*, Oulu, Finland; *c* and *d*, Tvärminne, Finland).

GERMANY: Sarstedt (Niedersachsen); Diez a. d. Lahn (Rheinland); Beuron (Württemberg).

SWITZERLAND: Weissenstein range (Jura); Mt. Jorat near Lausanne (Vaud); Bex, Zermatt, and Münster (Valais); Gurten near Bern (Bern); Göschenen (Uri); St. Moritz, Campfer and Vulpera (Grisons); Bellinzona and Contra near Locarno (Ticino).

ITALY: Fiè [formerly Völs] and below Rolle Pass (Dolomites).

*Palaeopsylla soricis rosickyi*¹ subsp. n.

(Text-figs. 13, 16, 19)

- Palaeopsylla sorecis* Dale. Wagner, 1930, *Acta Soc. ent. jugoslav.* 3-4 : 24 (Slovenia, Yugoslavia) ; Rosický, 1947, *Ent. Listy*, 10 : 31 (Jeseniky, Czechoslovakia) ; Rosický, 1950, *Vestn. Csl. Zool. Spol.* 14 : 138-140 (Czechoslovakia) ; Rosický, 1952, *Acta ent. Mus. nat. Prag.* 28 : 7 (Czechoslovakia) ; Niewiadomska, 1953, *Fragm. faun. Mus. Zool. polon.* 6 : 257 (Gorzów, Poland) ; Skuratowicz, 1954, *Acta Parasitol. polon.* 2 : 80 (Poland : Lobodno, Bolków, Gorzyn) ; Lachmajer & Skierska, 1956, *Wiadom. Parazytol.* 2 : 107 (Szczecin district, Poland) ; Jurik, 1957, *Priv. Sborn. Ostrav. Kraje*, 18 : 120 (Jeseniky, Czechoslovakia) ; Radvan, 1959, *Acta Mus. Reginaehrad.* 2 : 196 (Hradec Králové district, Czechoslovakia).
- Palaeopsylla soricis soricis* (Dale). Smit, 1953, *Ent. Medd.* 26 : 534 (Denmark) ; Rosický, 1955, *Zool. ent. Listy*, 4 : 368 (High Tatra, Czechoslovakia) ; Smit, 1955, *Cat. Faun. Austr.* XIXz : 3 (Austria) ; Rosický, 1959, *Acta Mus. nation. Prag.* 15 : 150, 154 (Krkonoše, Czechoslovakia) ; Rosický & Carnelutti, 1959, *Csl. Parasitol.* 6 : 142 (Slovenia, Yugoslavia).

DESCRIPTION. MALE. Apical margin of distal arm of sternum IX almost as oblique as in the nominate subspecies (Text-fig. 13, cf. Text-fig. 12). Dorso-posterior angle of lateral wall of aedeagus (Text-fig. 16) smoothly rounded ; below this angle the margin of the right-hand side wall is somewhat thickened ; the outer surface of the apical portion of the lateral wall virtually without striae (which are distinct in the nominate subspecies) ; for other differences in the aedeagi between this and the other subspecies contrast Text-fig. 16 with Text-figs. 15 and 17.

FEMALE. Not distinguishable from that of the nominate subspecies or from that of *P. s. starki*.

The distribution, shown in Text-fig. 19, is based on the data of the male specimens in the material listed below.

Material examined :

CZECHOSLOVAKIA : Male holotype, female allotype and two male and two female paratypes from Cheb [formerly Eger], Bohemia, *Sorex araneus*, 1.vi.1908 (*E. Hentschel*) ; 1 ♂, Karlova Studánka [formerly Karlsbrunn], Jeseniky, *Sorex araneus*, 4.iv.1934 (*K. Maschke*).

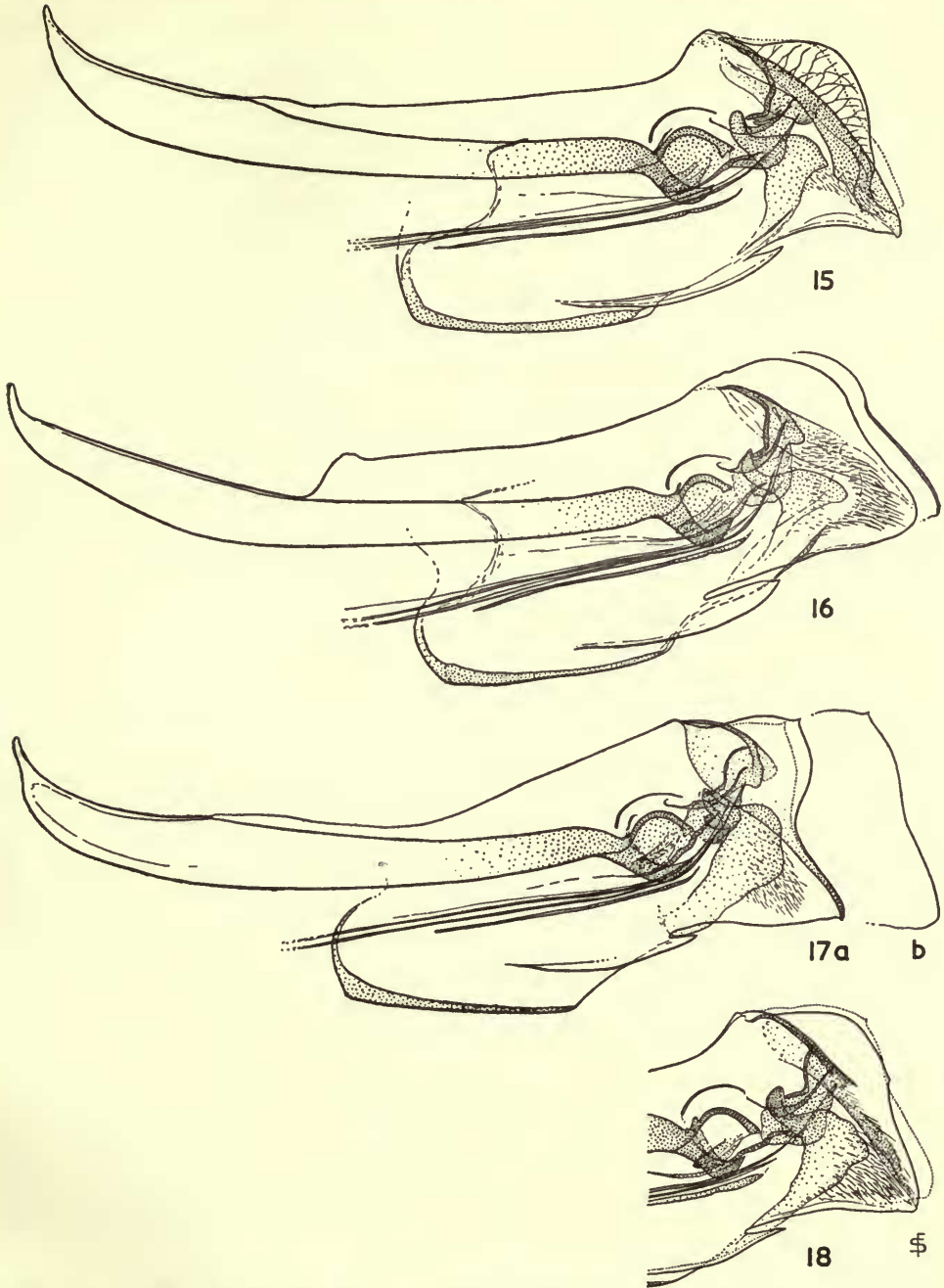
SWEDEN : 2 ♂, Skanör.

DENMARK : 1 ♂, Ryget (Sjaelland), *Sorex* sp., 15.xi.1919.

GERMANY : 4 ♂, 2 ♀, Magdeburg, *Sorex araneus*, 4.viii.1911 (*O. Ringelke*) ; 1 ♂, 2 ♀, Biederitz near Magdeburg, *Sorex araneus*, 26.viii.1900 (*O. Ringelke*) ; 3 ♂, Haag am Amper, Bavaria, *Neomys fodiens*, 15.v.1948 (*G. Heinrich*) ; 5 ♂, 2 ♀, Haag am Amper, *Sorex araneus*, iv-v.1948 (*G. Heinrich*) ; 1 ♂, Haag am Amper, *Talpa europaea*, 1948 (*G. Heinrich*) ; 3 ♂, 1 ♀, Berchtesgaden, 1,200 m., Bavaria, *Neomys fodiens*, v.1947 (*G. Heinrich*) ; 1 ♂, Berchtesgaden, 1,100 m., *Sorex alpinus* (*G. Heinrich*) ; 1 ♂, Waldmünchen, Bavaria, 800 m., *Sorex alpinus* (*G. Heinrich*) ; 1 ♂, Niesky, Schlesien, *Mus musculus*, (*W. Baer*).

POLAND : 1 ♂, 1 ♀, Lobodno, Katowice Province, *Sorex araneus*, 1949 (*W. Skuratowicz*) ; 1 ♂, Bolków, Wrocław Province, nest of *Erinaceus europaeus*, 24.vii.1952 (*J. Rafalski*) ; 1 ♂, 1 ♀, Stare Jablonki, Olsztyn Province, *Sorex araneus*, 24.v.1955

¹ Pronounced as rosítskii.



FIGS. 15-17. Phallosome of: 15. *Palaeopsylla soricis soricis* (Dale) (neotype); 16. *P. soricis rosickyi* subsp. n. (Karlova Studánka, Czechoslovakia) (in this figure the right-hand side apical margin is shown separately); 17. *P. soricis starcki* Wagner (*a*, Biharfüred, Romania; *b*, Tvärminne, Finland).

FIG. 18. Aedeagus of specimen intermediate between *P. soricis starcki* and *P. soricis rosickyi* (Abisko, Sweden).

(*W. Skuratowicz*); 1 ♂, Hofeberg, Glatzer Schneeberg, *Sorex* sp., 31.xii.1936 (*F. Pax*).

AUSTRIA: 2 ♂, Ferleiten (Salzburg), 1,150 m., *Sorex alpinus*, 2.vii.1951 (*K. Jordan*); 2 ♂ Ferleiten, *Clethrionomys glareolus*, 5 and 16.vii.1951 (*K. Jordan*); 1 ♀, Ferleiten, *Crocidura russula russula*, 21.vii.1951 (*K. Jordan*); 5 ♀, Ferleiten, *Sorex araneus tetragonurus*, 30.vi.1951 to 21.vii.1951 (*K. Jordan*); 1 ♂, Sölling (Niederösterreich), *Sorex araneus*, 6.ix.1951 (*F. Ressler*); 2 ♂, Admont (Steiermark), 1,200 m., *Sorex araneus*, vi.1950 (*G. Heinrich*); 1 ♂, Admont, 1,000 m., *Sorex alpinus*, 12.vi.1950 (*G. Heinrich*).

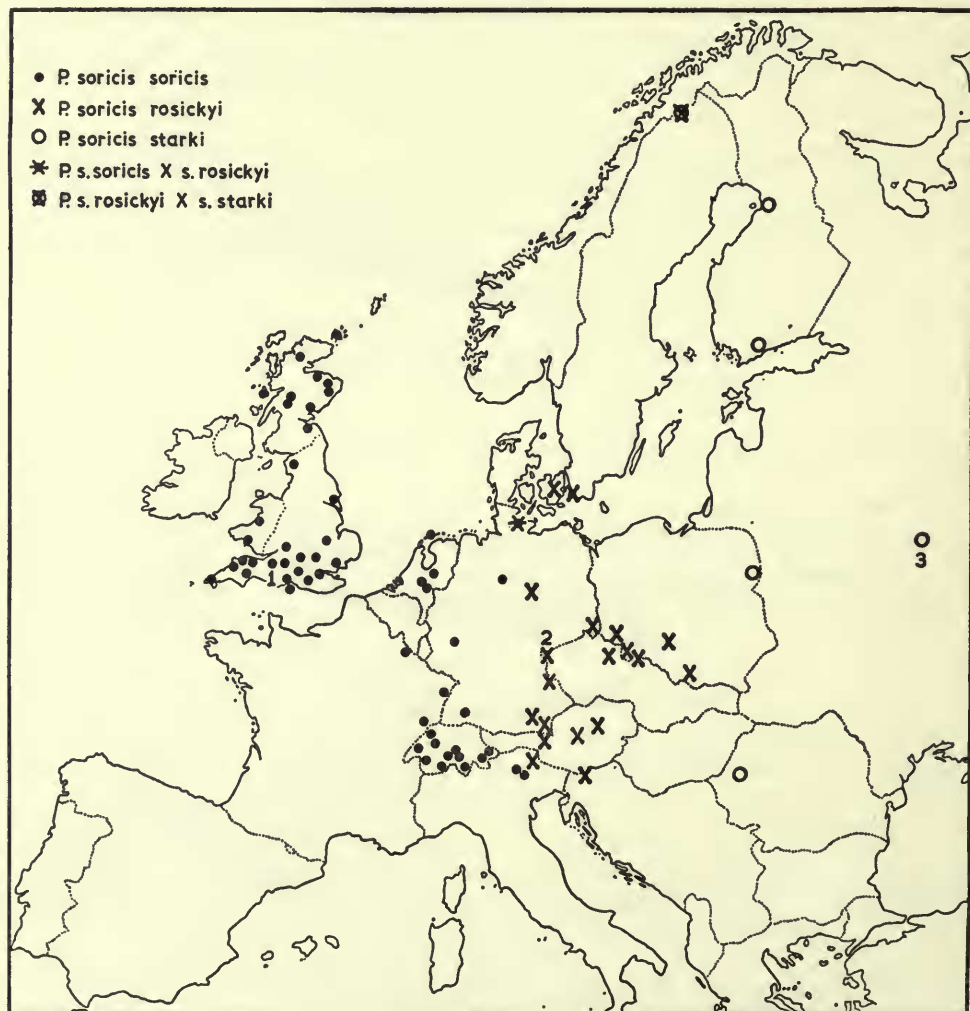


FIG. 19. Map showing the distribution of subspecies of *Palaeopsylla soricis* in Europe. 1 = Type locality of *P. soricis soricis* (Dale) (i.e. locality of neotype); 2 = Type locality of *P. soricis rosickyi* subsp. n.; 3 = Type locality of *P. soricis starki* Wagner.

YUGOSLAVIA: 1 ♂, 1 ♀, Jezersko, Slovenia, *Sorex* sp., viii.1936 (*J. Wagner*) [in Canadian National Collection].

ITALY: 12 ♂, 9 ♀, Misurina, Dolomites, *Sorex* sp., 30.vi.1926 (*K. Jordan*).

Through the courtesy of Prof. Dr. F. Peus I have seen a male from Kiel, Holstein, Germany, which is intermediate between this and the nominate subspecies, while Mr. G. P. Holland very kindly enabled me to study a male from Abisko, Sweden, which I regard to be intermediate between *P. s. rosickyi* and *P. s. starki* (the aedeagus of this specimen is shown in Text-fig. 18; the apex of the distal arm of sternum IX [not figured] is oblique).

This new subspecies is named in honour of Dr. B. Rosický, an ardent and prolific student of the Central European flea-fauna.

Palaeopsylla soricis starki Wagner, 1930

(Text-figs. 14, 17, 19)

Palaeopsylla soricis starki Wagner, 1930, *Annu. Mus. Zool. Acad. Sci. U.R.S.S.* 30: 542 (Orlovskiy Dvoriki, Bryanskaya oblast, U.S.S.R., from shrews); Argyropulo, 1941, *Trav. Mus. zool. Acad. Sci. R.S.S.Ukr.* 24: 16 (Kiyev oblast); Vysotskaya & Sazonova, 1953, *Parazit. Sborn. zool. Inst. Akad. Nauk S.S.R.* 15: 394 (Priozersk rayon, Leningrad oblast, Moscow oblast); Ioff & Tiflov, 1954, *Keys Aphaniptera south-east U.S.S.R.*: 93, 178, figs. 70, 141 (left-hand portion), 213.

Palaeopsylla starki Wagner (in litt.). Ioff & Tiflov, 1930, *Mag. Parasit., Leningr.* 1: 218 (Saratovskaya oblast).

Palaeopsylla soricis Dale. (?) Dampf, 1910, *Zool. Jb., Suppl.* 12: 620, figs. c, d (East Prussia, now NE. Poland); (?) Dampf, 1910, *Schr. phys.-ökon. Ges. Königsb.* 51: 43, figs. 1, 2; 1911, *l.c.* 51: 329, figs. 2, 5b (East Prussia, now NE. Poland); Dampf, 1912, *Korr.-Bl. Naturf. Ver. Riga*, 55: 25 (Estonian S.S.R.); Jordan & Rothschild, 1912, *Novit. zool.* 19: 62 (Bihar Mts., now in Romania); Nordberg, 1935, *Memor. Soc. Fauna Flora fenn.* 10: 360 (Uusimaa, Finland); (?) Martino, 1955, *Izv. Zool. Inst. Bulg. Akad. Nauk*, 4-5: 418 (Sofia, Bulgaria); Medinskij & Dajtyer, 1955, *Tez. Dohl. 8 Soveshch. parazitol. Probl.*: 97 (NW. Estonian S.S.R.); Lachmajer & Wegner, 1956, *Wiadom. Parazytol.* 2: 103 (Bialowieza, E. Poland); (?) Rosický, 1959, *Acta Acad. Sci. czechoslov. brun.* 31: 335 (Rila, Pirin and Vitoša Mountains, Bulgaria).

MALE. Apical margin of distal arm of sternum IX usually markedly obtuse (Text-fig. 14, cf. Text-figs. 12 and 13). Dorso-posterior angle of lateral wall of aedeagus (Text-fig. 17) drawn out into a small sharp point; for other differences between the aedeagus of this and the other subspecies contrast Text-fig. 17 with Text-figs. 15 and 16.

The distribution, shown in Text-fig. 19, is based on male specimens which I have examined from the following localities:

FINLAND: Oulu (Oulu); Tvärminne (Uusimaa).

POLAND: Bialowieza National Park.

ROMANIA: Biharfűred (Bihar Mts.).

Although the type-locality is marked on the map (Text-fig. 19, No. 3) I have not seen any topotypical material. However, Mrs. N. F. Darskaya most kindly compared the aedeagus of a Romanian specimen, as figured in Text-fig. 17a with the aedeagus of a male of *P. s. starki* from the Bryanskaya oblast (in the I. G. Ioff collection) and she informed me that—apart from an unimportant small difference—the two aedeagi agree perfectly.

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SOME NEW DIASPIDINI
(COCCOIDEA : HOMOPTERA)
FROM AFRICA



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